

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)



Applicant's or agent's file reference AL 298 PCT/Kr/H	FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No. PCT/EP 03/00556	International filing date (day/month/year) 17.01.2003	Priority date (day/month/year) 28.01.2002
International Patent Classification (IPC) or both national classification and IPC B21D13/04		
Applicant CORUS BAUSYSTEME GMBH et al.		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.
2. This REPORT consists of a total of 5 sheets, including this cover sheet.

☒ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

 These annexes consist of a total of 6 sheets.

3. This report contains indications relating to the following items:
 - ☒ Basis of the opinion
 - ☐ Priority
 - ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
 - ☐ Lack of unity of invention
 - ☒ Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
 - ☐ Certain documents cited
 - ☐ Certain defects in the international application
 - ☐ Certain observations on the international application

Date of submission of the demand 24.07.2003	Date of completion of this report 21.04.2004
Name and mailing address of the international preliminary examining authority:  European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tlx 523656 epmu d Fax: +49 89 2399 - 4465	Authorized Officer Rechler, W Telephone No. +49 89 2399-2354 

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT**

International application No. **PCT/EP 03/00556**

I. Basis of the report

1. With regard to the **elements** of the international application (*Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17)*):

Description, Pages

3-10 as originally filed
1, 2, 2a filed with telefax on 19.02.2004

Claims, Numbers

1-17 filed with telefax on 19.02.2004

Drawings, Sheets

1/4-4/4 as originally filed

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
☐ the language of publication of the international application (under Rule 48.3(b)).
☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
☐ filed together with the international application in computer readable form.
☐ furnished subsequently to this Authority in written form.
☐ furnished subsequently to this Authority in computer readable form.
☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

- ☐ the description, pages:
☐ the claims, Nos.:
☐ the drawings, sheets:

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5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)).

(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)

6. Additional observations, if necessary:

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes: Claims	1 - 11, 14 - 17
	No: Claims	12, 13
Inventive step (IS)	Yes: Claims	1 - 11
	No: Claims	12 - 17
Industrial applicability (IA)	Yes: Claims	1 - 17
	No: Claims	

2. Citations and explanations

see separate sheet

Re Item V:

1. Reference is made to the following documents:

D1: AU-B-482 986
D2: DE-C-34 09 151
D3: US-A-2 497 043
D4: US-A-5 664 451

2. The present application does not meet the requirements of the PCT, because the subject matter of claims 12 and 13 is not new in the sense of Article 33 (2) PCT in view of documents D2 - D4. These documents disclose each an apparatus with all features of the above mentioned claims in combination, which **is suitable** for forming corrugations such that the flange gets a non-rectilinear form in the plane of the panel. It is to be noted that "non-rectilinear" is not limited to the meaning of "curved" but includes also for example a trapezoidal shape.
3. Dependent claims 14 - 17 do not contain any features which, in combination with the features of any claim to which they refer, meet the requirements of the PCT in respect of novelty and/or inventive step, because in these claims merely slight constructional changes in the apparatus of claim 12 are defined which come within the scope of the customary practice followed by persons skilled in the art, especially as the advantages thus achieved can readily be foreseen. Consequently, the subject matter of claims 14 - 17 lacks an inventive step (Article 33 (3) PCT).
4. Document D2, which is considered to represent the closest state of the art with respect to claim 1, discloses a metal sheet for building purposes, comprising a panel and two standing flanges lengthwise at opposite sides of the panel, wherein one or both flanges have a non-rectilinear (but not curved) form in the plane of the panel, and wherein the panel contains one or more corrugations essentially parallel to one or both of the flanges.

The subject matter of claim 1 differs from the known panel in that the corrugation or corrugations give the flange or the flanges the non-rectilinear form, i.e. the non-rectilinear form is caused by the flanges.

2. The problem to be solved by the present application may therefore be regarded as

changing the outer form of a panel without removing material, for example by cutting.

This problem is solved by the combination of features set out in the independent method claim 8 and the resulting panel in the independent claim 1, especially by the feature that the corrugation(s) give(s) the panel a non-rectilinear form in the plane of the panel.

3. The present invention shall be considered to be new because no cited prior art document discloses all features of independent claims 1 and 8 in combination.
4. The cited documents do not disclose the essential subject matter concerning corrugations causing a non-rectilinear form of a panel. The available prior art documents cannot provide the skilled person with any lead to provide this subject matter at known building panels or method of manufacturing such panels and to combine all features defining the invention according to independent claims 1 and 8.
5. The industrial application of the invention is obvious.
6. Claims 2 - 7 and 9 - 11 are dependent on claim 1 or 8, respectively, and as such also meet the requirements of the PCT with respect to novelty and inventive step.

Further Remarks:

1. The features of the claims are not provided with reference signs placed in parentheses (Rule 6.2 (b) PCT).
2. Contrary to the requirements of Rule 5.1 (a) (ii) PCT, the relevant background art disclosed in the documents D1 - D4 is not mentioned in the description, nor are these documents identified therein.

AMENDED PAGES for PCT/EP03/00556 (WO03/064072)

**METAL SHEET FOR BUILDING PURPOSES, AND METHOD AND
APPARATUS FOR MAKING SUCH SHEETS**

The invention relates to a metal sheet for building purposes, comprising a panel and two standing flanges lengthwise at opposite sides of the panel, wherein one or both
5 flanges have a non-rectilinear form in the plane of the panel. The invention also relates to a method and an apparatus for making such sheets.

Metal sheets of this kind are well known and used in the construction of many buildings, and especially the roofs thereof. The longitudinal sides of the metal sheets are bent upwards to form two opposite flanges, so as to form standing seams which
10 are formed from one flange of one panel and the opposite flange of the neighbouring panel. For ease of forming the standing seams, the free ends of the flanges are often themselves flanged to be able to cooperate with each other and to be able to cooperate with holding elements for holding the roof or wall. The sheets normally have a length between approximately 1 to 100 meter, often about 10 metres or more,
15 and a width that can vary between for instance 100 and 2000 millimetre, mostly about 500 millimetre.

Most panels that are used for building purposes are rectangular sheets, which can be used for straight or curved roofs. Curving of metal sheets is known from for instance EP-A-1.138.403.

20 However, modern buildings are often designed with more complex forms, such as conical roofs. For the construction of conical roofs tapered panels have to be used. The forming of tapered sheets and the forming of flanges on a tapered sheet is known from for instance EP-A-1.138.424 and EP-A-1.138.405. The conicity of the tapered sheets can be given by a width of at least 140 mm at one end and a width of at most
25 1000 mm at the other end of the panel, but other widths are possible.

It is a first object of the invention to provide a metal sheet with standing flanges for building purposes, wherein one or both flanges have a non-rectilinear form in the plane of the panel, which can be used for buildings with other forms.

It is a second object of the invention to provide a method for forming such a
30 metal sheet.

It is a third object of the invention to provide an apparatus for forming such a metal sheet.

According to a first aspect of the invention, the first object of the invention is achieved with a metal sheet for building purposes, comprising a panel and two standing flanges lengthwise at opposite sides of the panel, wherein one or both flanges have a non-rectilinear form in the plane of the panel, characterised in that the panel contains one or more corrugations essentially parallel to one or both of the flanges, which corrugation or corrugations give the flange or flanges the non-rectilinear form.

Due to the non-rectilinear form of the flanges, it is possible to construct all types of complex forms of roofs or walls of buildings, for instance a roof that is slightly dome-shaped. For this situation, preferably metal sheets are used where one or both flanges have an essentially convex form. Such sheets having a convex form are less wide at their ends than they would have been when the flanges would have been straight. For both these examples, essentially rectangular sheets which are convex can be used.

The panel contains one or more corrugations essentially parallel to one or both of the flanges, which corrugation or corrugations give the flange or flanges the non-rectilinear form. Due to the corrugation or corrugations, an extra length of the sheet is taken up as seen over the width of the sheet. Starting from a metal sheet with straight standing flanges, the width of the panel is restricted at the place where a corrugation or corrugations exist. Due to the corrugation or corrugations the flanges thus get their non-rectilinear form.

According to another preferred embodiment, the metal sheet has one or both flanges that have an essential concave form. A metal sheet having a concave form is less wide halfway its length than it would have been when the flanges would have been straight. Essentially rectangular sheets which are concave can be used for a roof that is for instance wider at its ends than at the middle, or for other such roofs.

It has to be noted that a panel with flanges having a non-rectilinear form can have other forms than a convex or concave form. It is for instance possible that the flanges have an S-form, if that is needed for the construction of a roof or wall, or that a metal sheet has one flange with a convex form and one flange with a concave form, so the sheet is curved as a whole in its plane.

Preferably, when the flanges have an essentially convex form, a corrugation or corrugations are present in the portion of the panel at the end or the ends of the length of the sheet, and when the flanges have an essentially concave form, a corrugation or corrugations are present in the portion of the panel essentially halfway
5 along the length of the sheet. In this way at least one corrugation is present in that

AMENDED CLAIMS for PCT/EP03/00556 (WO03/064072)

1. Metal sheet for building purposes, comprising a panel and two standing flanges lengthwise at opposite sides of the panel, wherein one or both flanges have a non-rectilinear form in the plane of the panel, characterised in that the panel contains one or more corrugations essentially parallel to one or both of the flanges, which corrugation or corrugations give the flange or flanges the non-rectilinear form.
2. Metal sheet according to claim 1, wherein one or both flanges have an essentially convex form.
3. Metal sheet according to claim 1, wherein one or both flanges have an essentially concave form.
4. Metal sheet according to claim 2, wherein a corrugation or corrugations are present in the portion of the panel at the end or the ends of the length of the sheet.
5. Metal sheet according to claim 3, wherein a corrugation or corrugations are present in the portion of the panel essentially halfway the length of the sheet.
6. Metal sheet according to any one of the preceding claims, wherein the sheet is an essentially tapered sheet.
7. Metal sheet according to any of the preceding claims, wherein the sheet is a curved sheet.
8. Method for forming a metal sheet for building purposes, the sheet comprising a panel and two standing flanges lengthwise at opposite sides of the panel, the method comprising the step of forming one or more corrugations in the panel

essentially parallel to one or both of the flanges so as to give one or both of the flanges a non-rectilinear form in the plane of the panel.

- 5 9. Method according to claim 8, wherein one or more corrugations are formed over part of the length of the panel.
- 10 10. Method according to claim 8 or 9, wherein one or more corrugations are formed having different portions with a different height.
- 10 11. Method according to claim 8, 9 or 10, wherein the corrugation or corrugations are formed by using one or more profiled rolls.
- 15 12. Apparatus for forming a metal sheet for building purposes, the sheet comprising a panel and two standing flanges lengthwise at opposite sides of the panel, the apparatus comprising means for forming one or more corrugations in the panel essentially parallel to a flange, such that the flange gets a non-rectilinear form in the plane of the panel.
- 20 13. Apparatus according to claim 12, comprising means for aligning the flange of the metal sheet, parallel to which the corrugations have to be formed by the forming means, and preferably comprising means for driving the sheet through the forming means.
- 25 14. Apparatus according to claim 12 or 13, comprising means for guiding the flange after the corrugations have been formed by the forming means, and preferably comprising means for drawing the sheet through the forming means.
- 30 15. Apparatus according to claim 12, 13 or 14, wherein the forming means comprise one or more rolls having a circular protrusion, where the cross-section of the protrusion essentially corresponds to the cross-section of the corrugation to be formed, and preferably one or more cooperating rolls having a complementary circular recess.

16. Apparatus according to claim 15, wherein the roll or rolls with a circular protrusion are motor driven and preferably adjustable in height.
17. Apparatus according to claim 15 or 16, wherein the rolls are replaceable.

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